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ABSTRACT

The effects of strategy fading and progress feedback on children's achievement outcomes were investigated. Forty-four fifth graders with reading-skills deficiencies from 2 elementary schools received instruction on locating main ideas. Children were taught and verbalized a strategy, and some faded the verbalizations to inner speech. Half of the children in the fading and no fading conditions periodically received progress feedback linking strategy use with improved performance. The no fading/no feedback condition scored significantly lower than did the other three conditions on posttest self-efficacy, comprehension skills, and self-reported strategy use. Fading plus feedback led to higher reported strategy use compared with the fading-only and feedback-only conditions and to higher comprehension skills compared with the feedback-only conditions. These results support the idea that students receiving remedial reading services benefit from procedures requiring extensive cognitive activity and informing them about strategy usefulness. A table of means and standard deviations from the study and a 60-item list of references are included. (Author/SLD)

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Influence of Strategy Fading and Progress Feedback on Children's Reading Comprehension and Self-Efficacy

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Abstract

This experiment investigated the effects of strategy fading and progress feedback on children's achievement outcomes. Children with reading-skill deficiencies received instruction on locating main ideas. Children were taught and verbalized a strategy; some faded the verbalizations to inner speech. Half of the children in the fading and no fading conditions periodically received progress feedback linking strategy use with improved performance. The no fading/no feedback condition scored significantly lower than the other three conditions on posttest self-efficacy, comprehension skill, and self-reported strategy use. Fading plus feedback led to higher reported strategy use compared with the fading-only and feedback-only conditions and to higher comprehension skill compared with the feedback-only condition. These results support the idea that students receiving remedial reading services benefit from procedures requiring extensive cognitive activity and informing them about strategy usefulness.

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Influence of Strategy Fading and Progress Feedback on Children's Reading Comprehension and Self-Efficacy

Research and instruction in reading comprehension are increasingly stressing cognitive strategies, or systematic plans for encoding information and performing tasks (Dole, Duffy, Roehler, & Pearson, 1991; Weinstein & Mayer, 1986). Strategies help students attend to tasks, focus on important material, rehearse and organize information to be remembered, monitor comprehension, and create and maintain a favorable psychological climate for learning (deBettencourt, 1987; Garner, 1990; Meyers, Lytle, Palladino, Devenpeck, & Green, 1990; Paris, Lipson, & Wixson, 1983). Teaching students to use comprehension strategies raises their performance, achievement beliefs, and awareness of the strategy's benefits (Brailsford, Snart, & Das, 1984; Oka & Paris, 1987; Stevens, 1988). Strategy instruction is especially beneficial for students with learning problems, who often do not work on tasks systematically (Paris & Wixson, 1986; Raphael & McKinney, 1983; Short & Ryan, 1984).

At the same time, strategy instruction does not always promote performance among students with reading problems and does not ensure that students will maintain strategy use over time and outside of the instructional setting (Borkowski, Johnston, & Reid, 1987; Ringel & Springer, 1980; Schunk & Rice, 1987, 1992). These negative results may occur because students do not adequately learn the strategy, do not realize that strategy use promotes achievement, doubt their ability to apply the strategy, or believe that the strategy is less important for success than other factors (e.g., time available, teacher assistance) (Baker & Brown, 1984; Borkowski, 1985; Borkowski, Carr, Rellinger, & Pressley, 1990; Garner, 1990).

Having students verbalize the strategy as they use it to comprehend material can enhance the benefits of instruction (Graham & Harris, 1989a; Schunk, 1986). Overt verbalization is a form of private speech, or self-directed speech that is self-regulatory but not socially communicative (Berk, 1986; Fuson, 1979). Vygotsky (1962) believed that private speech helps develop thought through its role in behavioral self-regulation. From a learning perspective, verbalization is a form of rehearsal that directs attention to important task features and helps organize, code, and store information in memory (Schunk, 1986, 1989). Verbalization also highlights the value of the strategy for improving performance. Students who believe they can apply a strategy that aids learning may experience a sense of personal control over learning and use the strategy systematically (Borkowski et al., 1987; Schunk, 1989). Verbalizing strategic steps during reading often promotes comprehension better than does using a strategy without verbalizing (Alexander & Hare, 1989; Chan, 1991; Schunk & Rice, 1985).

One problem with verbalization is that students may discontinue verbalizing (and using) the strategy when not required to do so. Schunk and Cox (1986) provided students classified as learning disabled with instruction on subtraction strategies. Some students verbalized aloud while solving problems (continuous verbalization), others verbalized aloud for the first half of the instructional program but not during the second half (discontinued verbalization), and students in a third condition did not verbalize aloud (no verbalization). Continuous verbalization led to the highest performance. It is possible that discontinued-verbalization students abandoned using the

strategies when instructed to no longer verbalize aloud. They may have had difficulty internalizing the strategies; they may not have produced or used inner speech (covert instructions) to self-regulate their performances.

Vygotsky (1962) believed that overt verbalization represents the bridge between verbal control of a child's actions by external sources (e.g., parents) and subsequent self-regulation through inner speech. This suggests that the effects of strategy instruction can be enhanced by having students fade overt verbalizations to a covert level (Graham & Harris, 1989a; Meichenbaum, 1986). Meichenbaum's self-instructional training, for example, comprises modeling, guided practice, faded self-guidance (i.e., verbalizations faded to whispers), and covert self-instruction. This type of strategy internalization might facilitate strategy use among students with learning problems, because such cognitive activity can lead to better strategy encoding, retention, and retrieval (Borkowski & Cavanaugh, 1979).

Fading may also enhance performance through its effect on self-efficacy, or personal beliefs about one's capabilities to learn or perform skills at designated levels (Bandura, 1986, 1989). Self-efficacious students choose to engage in activities, expend effort to succeed, and persist when they encounter difficulties. Verbalization may raise efficacy because it can convey to students a sense of control over learning and that they are capable of applying strategies that improve their performances (Schunk, 1986). Perceived control and self-efficacy are further enhanced to the extent that fading makes strategies easily accessible when students need to use them.

Despite the theoretical importance of fading, there is a lack of evidence on how its addition to strategy instruction affects the acquisition and maintenance of reading comprehension skills and self-efficacy. Although strategy instruction that includes fading verbalizations to covert self-instructions raises skills and self-efficacy among students with learning problems (Chan, 1991; Graham & Harris, 1989b, 1989c), the treatments used in these studies comprised many components so the contribution of fading is unknown.

In the present study children with reading-skill deficiencies received strategy instruction on locating main ideas. All children verbalized the strategy; some students faded the strategy to a covert level. Self-efficacy, comprehension skill, and self-reported strategy use were measured before instruction and two weeks after the last session. Based on the preceding considerations, we predicted that the addition of fading would enhance children's achievement outcomes.

Another means of facilitating strategy instruction effects may be to provide progress feedback that links improved performance with strategy use (Borkowski, 1985; Borkowski et al., 1990; Paris, Wixson, & Palincsar, 1986; Ringel & Springer, 1980). Students will use a strategy when they believe it improves their work (Brown, Palincsar, & Armbruster, 1984). The belief that one can apply a strategy effectively can produce a sense of control over learning, which raises self-efficacy and motivates children to work systematically and continue using the strategy when no longer required (Bandura, 1986; Schunk, 1989). Progress feedback seems especially beneficial for children with reading problems, many of whom do not understand that a strategy is useful, doubt their learning capabilities, and believe they have

little control over outcomes (Butkowsky & Willows, 1980; Myers & Paris, 1978; Oka & Paris, 1987; Schunk & Rice, 1987, 1991, 1992).

Researchers stress that cognitive skills instruction should include strategy instruction, practice in applying and monitoring strategy use, information on strategy value and the tasks for which the strategy is useful, and feedback to enhance students' perceived control over outcomes (Baker & Brown, 1984; Borkowski et al., 1987; Oka & Paris, 1987). Little research has explored whether students with reading problems benefit from multiple procedures that teach them to use strategies and provide them with information about the strategy's benefits and their capabilities to apply it (Schunk & Rice, 1987). Research has not explored the combined effects of progress feedback and strategy instruction with fading. Such research will contribute to our knowledge of effective procedures to use with this student population and the processes underlying the effects of these procedures on learning.

In the present study, half of the children periodically received progress feedback linking strategy use with improved performance. We predicted that progress feedback would promote acquisition and maintenance of self-efficacy, skill, and strategy use. We also felt that combining fading with feedback would lead to higher outcomes compared with fading only and feedback only because the former represented the most complete set of influences on achievement outcomes. Fading was designed to help students internalize the strategy and improve self-regulation by making the strategy easily accessible, feedback was intended to provide information on strategy value, and both procedures were structured to enhance efficacy.

Method

Subjects

In consultation with school personnel we initially identified fifth-grade students (N = 52) from two elementary schools who regularly received remedial reading comprehension instruction as part of the school district's Chapter I reading program. Students had been placed in remedial classes by the school district because they scored at or below the 30th percentile (roughly equivalent to Grade 3) on the reading subtest of the SRA Survey of Basic Skills (Science Research Associates, 1985). Teachers nominated students who they felt would not experience excessive decoding problems while receiving comprehension instruction. We limited the sample in this fashion because the experiment focused on comprehension and decoding difficulties could mask the effects of the treatments.

The final sample comprised 44 students. Five of the original 52 were dropped because they had difficulty understanding the experimental instructions and three were randomly excluded from the appropriate conditions to equalize sizes. The 16 boys and 28 girls ranged in age from 10 years 1 month to 11 years 6 months (M = 10 years 8 months, S.D. = 3.5 months). Although different socioeconomic backgrounds were represented, children predominantly were lower-middle class. Ethnic composition of the sample was: 24 (55%) Hispanic American, 11 (25%) White American, 8 (18%) African American, 1 (2%) Asian American. About half of the students were in their first year of enrollment in the remedial program; the remainder were in their second or third year. One quarter received some instruction in

English-as-a-Second-Language (ESL) classes. These children were close to transition and subsequently were integrated into English language classes. We believe that all students in the final sample understood English well enough to comprehend the experimental instructions.

Pretest

The pretest comprised measures of self-efficacy, comprehension skill, and self-reported strategy use. It was administered to children by one of two female adult testers from outside the school.

Self-efficacy. The self-efficacy test assessed children's perceived capabilities for correctly answering different types of questions that tapped comprehension of main ideas. The efficacy scale ranged in 10-unit intervals from 10—not sure, to 100—really sure. The reading materials for the efficacy test included eight passages from books A, B, and C, of Scoring high in reading (Cohen & Foreman, 1978). Passages ranged from 4 to 25 sentences, and each passage was followed by one to four questions (e.g., "What is the first paragraph mostly about?", "What is the most important idea in this passage?", "What does the passage talk mostly about?", "What is the narrator's main feeling?", "What is a good title for this passage?") for a total of 20 questions. Four passages (nine questions) were appropriate for grade two students of average reading ability (book A), two passages (six questions) for grade three students (book B), and two passages (five questions) for grade four students (book C). Efficacy passages and questions corresponded in reading level to those on the ensuing skill test although they were not identical. Reliability of the efficacy measure was determined in prior research using children comparable in age and reading skills to those in the present study (Schunk & Rice, 1987). The test-retest reliability coefficient was .82.

Once children learned the meaning of the efficacy scale's direction and the different numerical values they read aloud each of the eight test passages. After children read each passage, the tester read aloud its questions one at a time. Children did not actually answer these questions. Rather, for each question students privately judged their capability of answering correctly questions of that type (i.e., same format and level of difficulty) and not whether they could answer that particular question. To prevent students from actually answering the questions they were not allowed to consult passages, questions did not appear on their test papers, and the tester read only the question without its multiple-choice alternatives. Children marked the efficacy value that corresponded to how they felt. The 20 efficacy judgments were averaged.

Skill. The comprehension skill test was administered immediately following the efficacy test and comprised 8 passages with 20 questions. Passages and questions were drawn from Cohen and Foreman (1978), were identical in format to efficacy passages and questions, and ranged in difficulty as described above. The tester presented children with each passage, along with its one or more multiple choice questions, one at a time. After children read each passage aloud, they answered its questions. Children received no assistance from the tester while they were reading and no feedback on the accuracy of their skill-test answers. Comprehension skill was the number of questions answered correctly.

Self-reported strategy use. This instrument, which measured children's self-reported use of the steps in the comprehension strategy, included five questions, each of which had a 10-unit scale ranging from 0—not at all, to 100—a whole lot. The scales were labeled: read the questions, read the passage, pay attention to keywords and details, reread and answer each question, reread passage when I cannot answer a question. The tester explained that students might take these actions to answer questions about passages they read. Children privately marked how often they typically performed each action while answering questions about passages. They were advised to be honest and mark the number that matched how they felt. Scores on the five scales were averaged. Internal consistency reliability was .78 (Cronbach's alpha).

Materials and Procedure

Children were assigned randomly within gender, ethnic background, and school, to one of four (n = 11) experimental conditions: fading only, feedback only, fading plus feedback, no fading or feedback. We made a few adjustments to this assignment to balance the four conditions for number of students enrolled in ESL classes and number in each year of the remedial program. All students received 35-min instructional sessions on 12 days spread over three weeks, during which they worked on a packet of materials. Children assigned to the same condition met in small groups (5-6 students per group, two groups per condition) with a female teacher from outside the school. The teacher was not informed of the purpose or hypotheses of the study. Groups met privately in classrooms; only one group was present in a room at a time.

The instructional packet consisted of several reading passages, each of which was followed by one or more multiple-choice questions tapping comprehension of main ideas. Passages were drawn from different sources and were similar to the test passages and to those typically used in children's remedial classes. Passages were ordered from least-to-most difficult; 40% of the material was appropriate for a second grade class of average reading ability, 40% for a third grade class, and 20% for a fourth grade class. Difficulty was varied through vocabulary and passage length. The material was carefully sequenced in the packet to ensure that children could successfully complete it. Children initially answered questions based on only a few sentences or short passages. Passage length increased until children were reading passages with several paragraphs. Although by the end of the last instructional session children were working on fourth-grade level appropriate material, approximately 90% of the material in the packet was at or below children's reading level.

The experimental procedure for all children during the first four instructional sessions was as follows. The teacher distributed the packet at the start of the first session. On a poster board was printed the five-step reading comprehension strategy (Schunk & Rice, 1987):

> What do I have to do? (1) Read the questions. (2) Read the passage to find out what it is mostly about. (3) Think about what the details have in common. (4) Think about what would make a good title. (5) Reread the story if I don't know the answer to a question.

After distributing the packet, the teacher pointed to the poster board and stated that they were going to use those steps to answer questions about what they read. The teacher then modeled the strategy and its application by stating, "What do I have to do? Read the questions." The teacher read aloud the multiple-choice questions for the first passage while children followed along, after which she pointed to and verbalized steps (2) and (3). The teacher explained that details refer to bits of information and gave some examples, and said that while she was reading she would be thinking about what the details have in common. She then read the passage aloud. The teacher pointed to and verbalized step (4) and explained that trying to think of a good title helps to remember important ideas in a story. She stated some of the details in the story, explained what they had in common, and made up a title. The teacher then read aloud the first question and its multiple choice answers, selected the correct answer, and explained her selection by referring to the passage. She answered the remaining questions in the same fashion.

Following this modeled demonstration, the teacher instructed children to repeat aloud each step after she verbalized it. She then said, "What do I have to do? Read the questions." After children verbalized these statements, she selected one student to read the questions aloud. When this child finished, the teacher instructed children to repeat after her steps (2) and (3). The teacher then called on a different child to read the passage aloud. When students stumbled on a word the teacher prompted with contextual and phonetic cues. After the child finished reading the passage, the teacher asked children to repeat step (4) after her and selected another student to think of a title for the story and explain his or her answer. The teacher then called on individual children to read aloud each of the questions with its answers and to answer that question. If a child answered a question incorrectly, the student verbalized step (5) and reread enough of the passage to answer the question correctly.

The instructional format for the remainder of the first session and the next three sessions was identical except that the teacher did not explicitly model the strategy. Instead, she called on children and had them verbalize and perform steps. This instructional procedure was substantially similar to what children typically received in their Chapter I classes. Although our instructional procedure was scripted to ensure standardized implementation, the teacher did not read the script but rather referred to it periodically to make sure she had covered the material.

Students assigned to the feedback only and no fading or feedback conditions continued to receive this instructional procedure during the remainder of the instructional program (sessions five through twelve). These students verbalized aloud the strategy's steps at the appropriate points prior to applying them to passages.

Fading procedure. At the start of the fifth instructional session the teacher told students assigned to the fading plus feedback and fading only conditions the following:

> We have been saying aloud each of these steps before we use them to help us read passages and answer questions. From now on we will whisper the steps to ourselves rather than saying them out loud.

The teacher initially demonstrated application of the predetermined fading procedure by following the preceding sequence except that instead of saying each step out loud she whispered it just loud enough for children to hear it. Following the modeled demonstration, children were instructed to whisper each step to themselves just loud enough for the teacher to hear it. This procedure was followed for the rest of the fifth instructional session. During the sixth, seventh, and eighth sessions the procedure was identical except that the teacher did not explicitly model the whispering but rather called on individual children to whisper and perform the steps.

At the start of the ninth session the teacher told children that rather than whispering the steps they would begin saying the steps silently to themselves (subvocally).

> We have been whispering aloud each of these steps before we used them to help us read passages and answer questions. From now on we will say the steps silently to ourselves rather than whisper them.

The teacher demonstrated application of this subvocal procedure by following the preceding procedure except that instead of whispering each step at the appropriate point she said it subvocally and signaled students she was doing that (e.g., the teacher said to students, "Now I'm going to say step 2 silently to myself," after which she said the step silently). Following this modeled demonstration, children were called on and verbalized each step silently at the appropriate time. This procedure was followed during the remainder of the ninth session and was similar during sessions 10, 11, and 12, except that the teacher did not demonstrate it but rather reminded students to state each step silently before applying it.

Progress feedback. Students assigned to the fading plus feedback and feedback only conditions received progress feedback linking their successes at answering comprehension questions with their proper application of the strategy. Each child received individual feedback 3-4 times during each instructional session. To ensure that feedback was credible, the teacher provided feedback after a child properly performed a step or answered a question correctly. Sample statements were (Schunk & Rice, 1992): "You got it right because you followed the steps in the right order," "Answering questions is easier when you follow these steps," "You've been answering a lot more questions correctly since you've been using these steps," "Do you see how thinking about what the details have in common helps you answer questions?"

Progress feedback should not be confused with performance feedback concerning the accuracy of students' answers to questions (e.g., "That's correct," "That's a good idea"). All children received performance feedback, but only students assigned to the fading + feedback or the feedback-only conditions received progress feedback.

Posttest

The posttest was administered two weeks following completion of the instructional program. This delay allowed us to assess maintenance of treatment effects on achievement outcomes. The tester, who had administered the pretest, was unaware of children's experimental assignments. The self-efficacy and strategy use tests were identical to those of the pretest.

A parallel form of the comprehension skill pretest was used to eliminate potential effects due to passage familiarity. Reliability was assessed during prior research (Schunk & Rice, 1987); children's scores on these parallel forms correlated highly (r = .87).

Results

To ensure that experimental conditions were comparable at the outset we conducted preliminary analyses of variance (ANOVAs) on demographic and pretest variables; the four experimental conditions constituted the treatment factor. These analyses yielded no significant differences between the four conditions on ethnicity, school, gender, age, or SRA score. There also were no significant between-conditions differences in pretest self-efficacy, comprehension skill, or strategy use. Experimental conditions did not differ in the number of passages completed during the instructional sessions (between 80 and 90). Means and standard deviations of pretest and posttest measures are presented by condition in Table 1.

Insert Table 1 about here

We predicted that providing students with strategy fading or progress feedback would raise self-efficacy, skill, and self-reported strategy use, more than would strategy instruction without fading or feedback and that the fading-plus-feedback treatment would raise these achievement outcomes better than fading or feedback alone. To test these hypotheses we applied an ANOVA to each of the three posttest measures using the four experimental conditions as the treatment factor.

ANOVA applied to the self-efficacy measure yielded a significant treatment effect, $F(3, 40) = 16.82$, $p < .001$. Posttest means were evaluated with Dunn's multiple comparison procedure (Kirk, 1982). These analyses showed that the fading-plus-feedback, fading-only, and feedback-only conditions judged efficacy higher than the no fading or feedback condition ($ps < .01$); however, the hypothesis that the fading-plus-feedback condition would judge self-efficacy higher than the fading-only and feedback-only conditions was not supported.

For comprehension skill a significant effect due to treatment was obtained, $F(3, 40) = 14.97$, $p < .001$. The fading-plus-feedback, fading-only, and feedback-only conditions demonstrated higher skill compared with the no fading or feedback condition ($ps < .01$ except $p < .05$ for the comparison of the feedback-only and the no fading or feedback conditions). Fading-plus-feedback children demonstrated higher skill than did feedback-only students ($p < .05$), but the former did not differ significantly from the fading-only condition.

ANOVA of the self-reported strategy use measure was significant, $F(3, 40) = 16.81$, $p < .001$. Analyses of posttest means supported the hypotheses. The fading-plus-feedback condition judged strategy use higher than the other three conditions ($ps < .01$) and the fading-only and feedback-only conditions reported greater strategy use than the no fading or feedback condition ($ps < .05$).

Correlational analyses were conducted to gain information on the relations between theoretically-relevant variables. We predicted that SRA score, posttest self-efficacy, posttest skill, and posttest self-reported strategy use, would be positively correlated. We felt that students with somewhat higher reading scores might perceive greater usefulness of the strategy and attempt to employ it systematically, feel more efficacious about comprehending passages and demonstrate higher skill. These predictions were partially supported. Self-efficacy was positively related to strategy use (r = .44, $p < .01$) and skill (r = .85, $p < .01$); strategy use and skill were positively related (r = .36, $p < .05$). SRA score was not significantly related to the other variables, possibly because subjects' scores were low and restricted in variability.

We also determined with multiple regression what portion of the variation in posttest skill was accounted for by the predictors of SRA score, pretest efficacy, pretest skill, pretest strategy use, experimental condition (as a categorical variable), posttest efficacy and posttest strategy use. Predictors were entered one at a time in the preceding order (SPSS Inc., 1986). Significant predictors were experimental condition (51% of the variation, $p < .01$), posttest efficacy (23%, $p < .01$), and posttest strategy use (3%, $p < .05$). Collectively, all seven predictors accounted for 81% of the variation in skill (R^2 adjusted = .778). We urge readers to view these findings with caution, because when multiple regression is used with a small sample the regression coefficients tend to be unstable from one sample to another (Cohen & Cohen, 1983). The present use of multiple regression seems justified to explore the influences on reading achievement, but replication with a larger sample is needed.

Discussion

The results of this study provide evidence on the effectiveness of multiple procedures designed for children with reading problems. Teaching students to use a comprehension strategy, having them verbalize the steps aloud and fade them to covert self-instructions, and periodically giving them feedback linking strategy use with improved performance, enhanced self-efficacy, skill, and self-reported strategy use, more than did strategy instruction with verbalization. Our combined treatment also raised skill and strategy use more than feedback alone and strategy use more than fading alone.

There is evidence that special student populations benefit from strategy instruction (Pressley et al., 1990), but little research has explored among students with reading problems the contributions of individual components of instructional procedures or the process underlying their effects. It is true that strategy-instructional treatments are complex and differ in many ways from comparison conditions, which makes it difficult to attribute effects to specific components (Pressley et al., 1990). The present study, which investigated the individual and combined effects of strategy instruction plus fading and progress feedback during reading comprehension, provides insight into effective procedures to use with students with reading problems and the process whereby these procedures may exert their effects.

The fading plus feedback treatment was comprehensive and included comprehension instruction, strategy training, a procedure for internalizing the strategy, and information about strategy usefulness. Collectively, these

elements were designed to promote self-regulation of strategy use and raise perceived efficacy by conveying that students could control their learning and were capable of applying a strategy. The effects of the fading + feedback treatment were not due to time on task because students in all conditions received the same amount of comprehension instruction and completed equivalent amounts of material. We believe that the success of the fading + feedback treatment was due to the type of cognitive activity it required and the student beliefs it engendered.

Fading helps students internalize the strategy's self-regulating function (Meichenbaum, 1986). Such cognitive activity can lead to better strategy encoding, retention, and subsequent retrieval from memory (Borkowski & Cavanaugh, 1979). Students who know they can easily access and apply a strategy are apt to experience a sense of control over learning, which raises self-efficacy, motivation to apply the strategy, and learning (Bandura, 1986; Schunk, 1986). Progress feedback informs students that the strategy is effective, they are making progress in learning, and they are capable of improving their skills (Schunk, 1989; Schunk & Rice, 1992). These beliefs are validated as students experience success. High self-efficacy, coupled with knowledge of how to use the strategy and the belief that it raises performance, motivates students to continue applying it and produces strategy maintenance (Pintrich & De Groot, 1990; Zimmerman & Martinez-Pons, 1990). It is noteworthy that fading plus feedback produced the highest self-reported strategy use. Over a longer time this strategy use advantage could translate into higher self-efficacy and skill and into higher correlations of strategy use with efficacy and skill, because as students use a strategy consistently their skill and perceptions of their capabilities should improve.

We found that fading-only and feedback-only students scored higher than no fading or feedback subjects on achievement outcomes. These findings conflict with results showing benefits of strategy instruction alone (Borkowski et al., 1987; Oka & Paris, 1987), but they are supported by prior research in which strategy instruction, with or without verbalization, did not raise outcomes in students with reading problems (Schunk & Rice, 1984, 1987, 1992). Such students benefit more from instructional procedures requiring greater cognitive activity and that convey in multiple ways that students are making progress in learning to apply a strategy that aids comprehension.

Although promising, the present results are limited in several ways. The subjects were poor readers. Strategy verbalization with fading seems especially beneficial for students with learning problems. Such students often do not work on tasks systematically or use inner speech to self-regulate their academic work (Harris, 1982; Paris & Wixson, 1986; Schunk, 1989). Progress feedback seems similarly beneficial for poor readers, who may not understand that a strategy is useful, believe that academic successes are beyond their control, and possess self-doubts about learning capabilities (Butkowsky & Willows, 1980; Myers & Paris, 1978; Oka & Paris, 1987; Schunk, 1989). In contrast, better readers typically work on tasks strategically, use task-specific covert self-instructions to guide their performances, monitor their work and self-regulate strategy use depending on task conditions, assess their progress and the effectiveness of strategies, and feel efficacious about performing well (Oka & Paris, 1987; Schunk, 1989). Although better readers might benefit from the present procedures, they are likely to have greater effects on remedial students.

A second limitation is that our intervention required subjects to work on the same materials at the same pace regardless of individual differences in learning rates or readiness for fading. Our fading procedure was predetermined in format and length of the components. This instructional format fit the purpose of the research and was similar to that typically used in subjects' Chapter I classes but is dissimilar in many ways to the highly individualized formats commonly found in special education settings. To improve generalizability we recommend replicating this study with greater flexibility in the pace at which students complete materials and using a criterion-based fading procedure reflecting students' individual capabilities to apply the strategy effectively. Some students might be able to move through the sequence quicker whereas others may benefit from additional time on some phases; frequent performance assessments would determine readiness and frequent efficacy assessments could gauge students' perceptions of their capabilities for progressing to the next phase.

A third limitation is that we assessed self-reported rather than actual strategy use. There is evidence that self-report measures generally represent students' beliefs accurately (Assor & Connell, 1992), and previous similar research obtained positive correlations between students' actual and self-reported use of a strategy (Schunk & Rice, 1992). Research exploring this relation is needed in the context of fading to determine whether students' self-reports match their actual use of an internalized strategy.

We believe that our results have some applicability to many students who receive special education services, although replication of this study with other special student populations is needed. For example, students with learning disabilities display characteristics similar to those in our sample of students with reading deficiencies. Students with learning disabilities often do not work on tasks strategically (Hallahan, Kneedler, & Lloyd, 1983) and hold low perceptions of learning capabilities (Chapman, 1988; Schunk, 1990). Such students can be taught to use learning strategies and show improved performance (Pressley et al., 1990), but they often do not recognize the value of strategies for improving performance, discontinue applying strategies when not required to use them, do not use strategies outside of training contexts, and do not internalize strategies so they can apply them when needed (Borkowski et al., 1987; Oka & Paris, 1987; Paris, Jacobs, & Cross, 1987; Schunk & Cox, 1986).

The present procedures were designed to address these problems. Our instructional format was a form of self-instructional training (Meichenbaum & Asarnow, 1979). Self-instructional training is an interactive means for teaching a strategy and helping students internalize it (Harris, 1982). Self-instructional training can help remedy academic deficits among students with learning disabilities (Alexander & Hare, 1989; Leon & Pepe, 1983; Swanson & Scarpati, 1984). Self-instructional training also can raise students' self-efficacy; the fading component is especially important because it helps students convert overt verbalizations into inner speech and it shows students that they can readily access and apply a strategy that helps improve their comprehension (Schunk, 1986). Progress feedback can raise skills and self-efficacy, and other evidence shows that providing students with learning disabilities information about a strategy's benefits raises strategy use (Paris et al., 1987).

The present results support the idea that self-efficacy is not merely a reflection of prior performances (Bandura, 1986). Experimental conditions did not differ in the number of passages completed during instruction but children who received fading or progress feedback subsequently judged self-efficacy higher. This study also shows that self-efficacy helps to predict skillful performance. Personal expectations for success are viewed as important influences on achievement by different theoretical approaches (Bandura, 1989; Covington, 1987; Weiner, 1985).

Despite this study's limitations and the need for additional research, these results have implications for teaching. Our subjects apparently internalized and used a reading comprehension strategy to regulate their performances. Our strategy fading and progress feedback treatments can be incorporated easily into comprehension instruction with students with reading problems in various settings (resource rooms, self-contained classes, regular classes). We recommend use of these procedures as a way to foster students' self-regulated strategy use, self-efficacy, and skills.

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Table 1

Means (and Standard Deviations) of Pretest and Posttest Measures

		Experimental Condition			
Measure	Phase	Fading Only	Feedback Only	Fading + Feedback	No Fading or Feedback
Self-Efficacy	Pretest	58.3 (12.1)	59.5 (10.6)	57.9 (13.5)	53.8 (13.3)
	Posttest	81.4 (7.3)	79.2 (8.4)	85.4 (5.3)	63.2 (9.7)
Skill	Pretest	5.6 (1.4)	5.4 (1.2)	5.8 (1.5)	5.5 (3.2)
	Posttest	12.1 (2.6)	10.0 (1.9)	13.1 (2.4)	7.1 (2.1)
Strategy Use	Pretest	51.5 (10.8)	50.9 (16.0)	54.4 (16.3)	49.3 (13.3)
	Posttest	68.4 (15.5)	69.1 (9.3)	87.6 (7.8)	54.7 (9.5)

Note. Self-efficacy means represent the average judgment per question; range of scale is 10(low) to 100. Skill means represent the number of correct answers out of 20 questions. Strategy use score is the mean of the five steps; range is 0(low) to 100.